

WINTER 2013

COOL Research News



JDRF is committed to improving the lives of all people affected by type 1 diabetes (T1D)—whether you are newly diagnosed or have been living with the disease for a long time. We aim to accelerate the progress of research to provide life-changing treatments and ultimately a cure for T1D. We hope that you will enjoy reading about two exciting areas of research that have the potential to bring us closer to our goal.

New Insights into Factors Affecting T1D Development

In the human body, the intestines—or “gut”—house a microscopic community made up of millions of bacteria. These bacteria, called gut microbes, are essential for metabolism and the development of the immune system. Early in life, gut microbes help the body build a process called immunoregulation. This is how the immune system controls and balances all of its components and their interactions to defend against sickness and disease. But for reasons that are not known, immunoregulation development can go haywire and lead to the onset of an autoimmune disease. JDRF is funding research to investigate whether changes in gut microbes early in life lead to weaker immunoregulation and possibly type 1 diabetes (T1D).

JDRF-funded researchers at The Hospital for Sick Children in Toronto recently determined that exposure to normal gut microbes early in life protects against autoimmune diseases in mice. In the mouse strain used, more than 85 percent of females develop T1D due to strong genetic risk factors. But when the female mice in the study were given gut bacteria from adult male mice early in life, only 25 percent of them developed T1D. The findings suggest that gut bacteria could be used to block the progression of insulin-dependent diabetes in children who have a high genetic risk for developing it.

Researchers do not know exactly how the microbes are interacting with the immune processes of T1D to lead to autoimmunity, but this study opens an exciting new pathway to investigate the potential of altering gut microbes to prevent autoimmune diseases.

JDRF to Develop a Pump That Delivers Two Hormones Instead of One

People with T1D administer their daily doses of insulin in a variety of ways, including using syringes or pumps. Some people with T1D also use a combination of hormones and/or drug treatments in conjunction with an infusion pump. Current infusion pumps can deliver only one hormone (insulin) to control blood-glucose levels, but the pancreas produces more than just insulin to aid in metabolism, digestion, and blood-glucose control. For people with T1D who use a combination treatment, managing the disease could be much easier if a single device could deliver multiple types of hormones.

To address this issue, JDRF is partnering with Tandem Diabetes Care to create a first-of-its-kind, dual-chamber infusion pump that can simultaneously deliver two hormonal drug therapies. The two-year partnership is designed to accelerate the development of a next-generation, fully automated artificial pancreas system using hormonal drug therapies in conjunction with insulin. (Artificial pancreas systems combine a continuous glucose monitor and an insulin infusion pump and automate their functions by way of a portable computer running a sophisticated algorithm.) A dual-chamber infusion pump could help evolve the artificial pancreas to a future generation of devices that more closely mimics the function of a healthy human pancreas. These types of devices present an exciting opportunity to improve the health and quality of life for people with T1D.

To find out more about T1D research, or how to get involved with JDRF in your community, visit www.jdrf.org.